

SEQUENCE LISTING

<110> Japan Science and Technology Corporation

<120> Method for Producing an Antibody with Genetic Immunization

<130> 01F033PCT

<140> PCT/JP01/06371

<141> 2001-07-24

<150> JP2000-222743

<151> 2000-07-24

<150> JP2000-254407

<151> 2000-08-24

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<170> Patent In Ver. 2.1

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<213> Homo sapiens

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aatcaaaacg ctgattaaaa gaagcacggt atg atg acc aaa cat aaa aag tgt 174

Met Met Thr Lys His Lys Lys Cys

1

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ttt ata att gtt ggt gtt tta ata aca act aat att att act ctg ata 222

Phe Ile Ile Val Gly Val Leu Ile Thr Thr Asn Ile Ile Thr Leu Ile

10

15

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gtt aaa cta act cga gat tct cag agt tta tgc ccc tat gat tgg att 270

Val Lys Leu Thr Arg Asp Ser Gln Ser Leu Cys Pro Tyr Asp Trp Ile

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ggg ttc caa aac aaa tgc tat tat ttc tct aaa gaa gaa gga gat tgg				318
Gly Phe Gln Asn Lys Cys Tyr Tyr Phe Ser Lys Glu Glu Gly Asp Trp				
	45	50	55	
aat tca agt aaa tac aac tgt tcc act caa cat gcc gac cta act ata				366
Asn Ser Ser Lys Tyr Asn Cys Ser Thr Gln His Ala Asp Leu Thr Ile				
	60	65	70	
att gac aac ata gaa gaa atg aat ttt ctt agg cgg tat aaa tgc agt				414
Ile Asp Asn Ile Glu Glu Met Asn Phe Leu Arg Arg Tyr Lys Cys Ser				
	75	80	85	
tct gat cac tgg att gga ctg aag atg gca aaa aat cga aca gga caa				462
Ser Asp His Trp Ile Gly Leu Lys Met Ala Lys Asn Arg Thr Gly Gln				
	90	95	100	
tgg gta gat gga gct aca ttt acc aaa tgc ttt ggc atg aga ggg agt				510
Trp Val Asp Gly Ala Thr Phe Thr Lys Ser Phe Gly Met Arg Gly Ser				
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gaa gga tgt gcc tac ctc agc gat gat ggt gca gca aca gct aga tgt				558
Glu Gly Cys Ala Tyr Leu Ser Asp Asp Gly Ala Ala Thr Ala Arg Cys				
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tac acc gaa aga aaa tgg att tgc agg aaa aga ata cac taa				600
Tyr Thr Glu Arg Lys Trp Ile Cys Arg Lys Arg Ile His				
	140	145	150	
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agtacttttt taattaaca aagttcgagt ttgtac				697

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<213> Homo sapiens

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20

25

30

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Ser Leu Cys Pro Tyr Asp Trp Ile Gly Phe Gln Asn Lys Cys Tyr Tyr
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 Phe Ser Lys Glu Glu Gly Asp Trp Asn Ser Ser Lys Tyr Asn Cys Ser
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 Thr Gln His Ala Asp Leu Thr Ile Ile Asp Asn Ile Glu Glu Met Asn
 65 70 75 80
 Phe Leu Arg Arg Tyr Lys Cys Ser Ser Asp His Trp Ile Gly Leu Lys
 85 90 95
 Met Ala Lys Asn Arg Thr Gly Gln Trp Val Asp Gly Ala Thr Phe Thr
 100 105 110
 Lys Ser Phe Gly Met Arg Gly Ser Glu Gly Cys Ala Tyr Leu Ser Asp
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 Asp Gly Ala Ala Thr Ala Arg Cys Tyr Thr Glu Arg Lys Trp Ile Cys
 130 135 140
 Arg Lys Arg Ile His
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 Ala Val Glu Ala Thr Gly Glu Lys Val Leu Arg Tyr Glu Thr Phe Ile
 10 15 20

 agt gac gtg ctg cag cgg gac ttg cga aag gtg ctg gac cat cga gac 149
 Ser Asp Val Leu Gln Arg Asp Leu Arg Lys Val Leu Asp His Arg Asp
 25 30 35 40

 aag gta tat gag cag ctg gcc aaa tac ctt caa ctg aga aat gtc att 197
 Lys Val Tyr Glu Gln Leu Ala Lys Tyr Leu Gln Leu Arg Asn Val Ile
 45 50 55

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gag cga ctc cag gaa gct aag cac tcg gag tta tat atg cag gtg gat 245
 Glu Arg Leu Gln Glu Ala Lys His Ser Glu Leu Tyr Met Gln Val Asp
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 Leu Gly Cys Asn Phe Phe Val Asp Thr Val Val Pro Asp Thr Ser Arg
 75 80 85

atc tat gtg gcc ctg gga tat ggt ttt ttc ctg gag ttg aca ctg gca 341
 Ile Tyr Val Ala Leu Gly Tyr Gly Phe Phe Leu Glu Leu Thr Leu Ala
 90 95 100

gaa gct ctc aag ttc att gat cgt aag agc tct ctc ctc aca gag ctc 389
 Glu Ala Leu Lys Phe Ile Asp Arg Lys Ser Ser Leu Leu Thr Glu Leu
 105 110 115 120

agc aac agc ctc acc aag gac tcc atg aat atc aaa gcc cat atc cac 437
 Ser Asn Ser Leu Thr Lys Asp Ser Met Asn Ile Lys Ala His Ile His
 125 130 135

atg ttg cta gag ggc ctt aga gaa cta caa ggc ctg cag aat ttc cca 485
 Met Leu Leu Glu Gly Leu Arg Glu Leu Gln Gly Leu Gln Asn Phe Pro
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 Arg Lys Val Leu Asp His Arg Asp Lys Val Tyr Glu Gln Leu Ala Lys
 35 40 45
 Tyr Leu Gln Leu Arg Asn Val Ile Glu Arg Leu Gln Glu Ala Lys His
 50 55 60

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Ser Glu Leu Tyr Met Gln Val Asp Leu Gly Cys Asn Phe Phe Val Asp
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Thr Val Val Pro Asp Thr Ser Arg Ile Tyr Val Ala Leu Gly Tyr Gly
85              90              95
Phe Phe Leu Glu Leu Thr Leu Ala Glu Ala Leu Lys Phe Ile Asp Arg
100            105            110
Lys Ser Ser Leu Leu Thr Glu Leu Ser Asn Ser Leu Thr Lys Asp Ser
115            120            125
Met Asn Ile Lys Ala His Ile His Met Leu Leu Glu Gly Leu Arg Glu
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<223> Artificial Sequence: Synthesized oligonucleotide

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<213> Homo sapiens

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<222> (25).. (915)

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 Gln Gln Leu Gly Leu Leu Gly Cys Leu Gly His Gly Ala Leu Val Leu
 10 15 20 25

caa ctc ctc tcc ttc atg ctc ttg gct ggg gtc ctg gtg gcc atc ctt 147
 Gln Leu Leu Ser Phe Met Leu Leu Ala Gly Val Leu Val Ala Ile Leu
 30 35 40

gtc caa gtg tcc aag gtc ccc agc tcc cta agt cag gaa caa tcc gag 195
 Val Gln Val Ser Lys Val Pro Ser Ser Leu Ser Gln Glu Gln Ser Glu
 45 50 55

caa gac gca atc tac cag aac ctg acc cag ctt aaa gct gca gtg ggt 243
 Gln Asp Ala Ile Tyr Gln Asn Leu Thr Gln Leu Lys Ala Ala Val Gly
 60 65 70

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cag ctc tca gag aaa tcc aag ctg cag gag atc tac cag gag ctg acc	291
Glu Leu Ser Glu Lys Ser Lys Leu Gln Glu Ile Tyr Gln Glu Leu Thr	
75 80 85	
cag ctg aag gct gca gtg ggt gag ttg cca gag aaa tcc aag ctg cag	339
Gln Leu Lys Ala Ala Val Gly Glu Leu Pro Glu Lys Ser Lys Leu Gln	
90 95 100 105	
gag atc tac cag gag ctg acc cgg ctg aag gct gca gtg ggt gag ttg	387
Glu Ile Tyr Gln Glu Leu Thr Arg Leu Lys Ala Ala Val Gly Glu Leu	
110 115 120	
cca gag aaa tcc aag ctg cag gag atc tac cag gag ctg acc cgg ctg	435
Pro Glu Lys Ser Lys Leu Gln Glu Ile Tyr Gln Glu Leu Thr Arg Leu	
125 130 135	
aag gct gca gtg ggt gag ttg cca gag aaa tcc aag ctg cag gag atc	483
Lys Ala Ala Val Gly Glu Leu Pro Glu Lys Ser Lys Leu Gln Glu Ile	
140 145 150	
tac cag gag ctg acc cgg ctg aag gct gca gtg ggt gag ttg cca gag	531
Tyr Gln Glu Leu Thr Arg Leu Lys Ala Ala Val Gly Glu Leu Pro Glu	
155 160 165	
aaa tcc aag ctg cag gag atc tac cag gag ctg acg gag ctg aag gct	579
Lys Ser Lys Leu Gln Glu Ile Tyr Gln Glu Leu Thr Glu Leu Lys Ala	
170 175 180 185	
gca gtg ggt gag ttg cca gag aaa tcc aag ctg cag gag atc tac cag	627
Ala Val Gly Glu Leu Pro Glu Lys Ser Lys Leu Gln Glu Ile Tyr Gln	
190 195 200	
gag ctg acc cag ctg aag gct gca gtg ggt gag ttg cca gac cag tcc	675
Glu Leu Thr Gln Leu Lys Ala Ala Val Gly Glu Leu Pro Asp Gln Ser	
205 210 215	
aag cag cag caa atc tat caa gaa ctg acc gat ttg aag act gca ttt	723
Lys Gln Gln Gln Ile Tyr Gln Glu Leu Thr Asp Leu Lys Thr Ala Phe	
220 225 230	
gaa cgc ctg tgc cgc cac tgt ccc aag gac tgg aca ttc ttc caa gga	771
Glu Arg Leu Cys Arg His Cys Pro Lys Asp Trp Thr Phe Phe Gln Gly	
235 240 245	

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Asn Cys Tyr Phe Met Ser Asn Ser Gln Arg Asn Trp His Asp Ser Val
250                255                260                265

acc gcc tgc cag gaa gtg agg gcc cag ctc gtc gta atc aaa act gct 867
Thr Ala Cys Gln Glu Val Arg Ala Gln Leu Val Val Ile Lys Thr Ala
                270                275                280

gag gag cag ctt cca gcg gta ctg gaa cag tgg aga acc caa caa tag 915
Glu Glu Gln Leu Pro Ala Val Leu Glu Gln Trp Arg Thr Gln Gln
                285                290                295

cgggaatgaa gactgtcgg aatttagtgg cagtggctgg aacgacaatc gatgtgacgt 975

tgacaattac tggatctgca aaaagcccg cgcctgtctc agagacgaat agttgtttcc 1035

ctgctagcct cagcctccat tgttggtatag cagaacttca ccacttgta agccagcgct 1095

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gagcttgtgt tcttggccca tccttggagc ttataaagt accctgagtgg gatgcattta 1275

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ccagagaggg catggaggct ccatacaacc tcttccacc ccacatcttt ctttgtccta 1575

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1643

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<222> (118).. (1236)

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atg aag tat ctc cgg cac cgg cgg ccc aat gcc acc ctc att ctg gcc 165
Met Lys Tyr Leu Arg His Arg Arg Pro Asn Ala Thr Leu Ile Leu Ala
1 5 10 15

atc ggc gct ttc acc ctc ctc ctc ttc agt ctg cta gtg tca cca ccc 213
Ile Gly Ala Phe Thr Leu Leu Leu Phe Ser Leu Leu Val Ser Pro Pro
20 25 30

acc tgc aag gtc cag gag cag cca ccg gcc atc ccc gag gcc ctg gcc 261
Thr Cys Lys Val Gln Glu Gln Pro Pro Ala Ile Pro Glu Ala Leu Ala
35 40 45

tgg ccc act cca ccc acc cgc cca gcc ccg gcc ccg tgc cat gcc aac 309
Trp Pro Thr Pro Pro Thr Arg Pro Ala Pro Ala Pro Cys His Ala Asn
50 55 60

acc tct atg gtc acc cac ccg gac ttc gcc acg cag ccg cag cac gtt 357
Thr Ser Met Val Thr His Pro Asp Phe Ala Thr Gln Pro Gln His Val
65 70 75 80

cag aac ttc ctc ctg tac aga cac tgc cgc cac ttt ccc ctg ctg cag 405
Gln Asn Phe Leu Leu Tyr Arg His Cys Arg His Phe Pro Leu Leu Gln
85 90 95

gac gtg ccc ccc tct aag tgc cgc cag ccg gtc ttc ctg ctg ctg gtg 453
Asp Val Pro Pro Ser Lys Cys Ala Gln Pro Val Phe Leu Leu Leu Val
100 105 110

atc aag tcc tcc cct agc aac tat gtg cgc cgc gag ctg ctg cgg cgc 501
Ile Lys Ser Ser Pro Ser Asn Tyr Val Arg Arg Glu Leu Leu Arg Arg
115 120 125

acg tgg ggc cgc gag cgc aag gta cgg ggt ttg cag ctg cgc ctc ctc 549
Thr Trp Gly Arg Glu Arg Lys Val Arg Gly Leu Gln Leu Arg Leu Leu
130 135 140

ttc ctg gtg ggc aca gcc tcc aac ccg cac gag gcc cgc aag gtc aac 597

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Arg Leu Leu Glu Leu Glu Ala Gln Thr	His Gly Asp Ile Leu Gln Trp	
165	170 175	
gac ttc cac gac tcc ttc ttc aac ctc acg ctc aag cag gtc ctg ttc		693
Asp Phe His Asp Ser Phe Phe Asn Leu Thr Leu Lys Gln Val Leu Phe		
180	185 190	
tta cag tgg cag gag aca agg tgc gcc aac gcc agc ttc gtg ctc aac		741
Leu Gln Trp Gln Glu Thr Arg Cys Ala Asn Ala Ser Phe Val Leu Asn		
195	200 205	
ggg gat gat gac gtc ttt gca cac aca gac aac atg gtc ttc tac ctg		789
Gly Asp Asp Asp Val Phe Ala His Thr Asp Asn Met Val Phe Tyr Leu		
210	215 220	
cag gac cat gac cct ggc cgc cac ctc ttc gtg ggg caa ctg atc caa		837
Gln Asp His Asp Pro Gly Arg His Leu Phe Val Gly Gln Leu Ile Gln		
225	230 235 240	
aac gtg ggc ccc atc cgg gct ttt tgg agc aag tac tat gtg cca gag		885
Asn Val Gly Pro Ile Arg Ala Phe Trp Ser Lys Tyr Tyr Val Pro Glu		
245	250 255	
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Val Val Thr Gln Asn Glu Arg Tyr Pro Pro Tyr Cys Gly Gly Gly Gly		
260	265 270	
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Phe Leu Leu Ser Arg Phe Thr Ala Ala Leu Arg Arg Ala Ala His		
275	280 285	
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Val Leu Asp Ile Phe Pro Ile Asp Asp Val Phe Leu Gly Met Cys Leu		
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Glu Leu Glu Gly Leu Lys Pro Ala Ser His Ser Gly Ile Arg Thr Ser		
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ggc gtg cgg gct cca tcg caa cac ctg tcc tcc ttt gac ccc tgc ttc		1125
Gly Val Arg Ala Pro Ser Gln His Leu Ser Ser Phe Asp Pro Cys Phe		

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Leu Met Trp Asp Ala Leu Asn Gln Pro Asn Leu Thr Cys Gly Asn Gln			
355	360	365	
aca cag atc tac tga gtcagcatca ggggtccccag cctctgggct cctgtttcca			1276
Thr Gln Ile Tyr			
370			
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tggagcgacc ccattacgct aaag atg aaa ggc tgg ggt tgg ctg gcc ctg	171
Met Lys Gly Trp Gly Trp Leu Ala Leu	
1 5	
ctt ctg ggg gcc ctg ctg gga acc gcc tgg gct cgg agg agc cag gat	219
Leu Leu Gly Ala Leu Leu Gly Thr Ala Trp Ala Arg Arg Ser Gln Asp	
10 15 20 25	
ctc cac tgt gga gca tgc agg gct ctg gtg gat gaa cta gaa tgg gaa	267
Leu His Cys Gly Ala Cys Arg Ala Leu Val Asp Glu Leu Glu Trp Glu	
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att gcc cag gtg gac ccc aag aag acc att cag atg gga tct ttc cgg	315
Ile Ala Gln Val Asp Pro Lys Lys Thr Ile Gln Met Gly Ser Phe Arg	
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atc aat cca gat ggc agc cag tca gtg gtg gag gtg cct tat gcc cgc	363
Ile Asn Pro Asp Gly Ser Gln Ser Val Val Glu Val Pro Tyr Ala Arg	
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tca gag gcc cac ctc aca gag ctg ctg gag gag ata tgt gac cgg atg	411
Ser Glu Ala His Leu Thr Glu Leu Leu Glu Glu Ile Cys Asp Arg Met	
75 80 85	
aag gag tat ggg gaa cag att gat cct tcc acc cat cgc aag aac tac	459
Lys Glu Tyr Gly Glu Gln Ile Asp Pro Ser Thr His Arg Lys Asn Tyr	
90 95 100 105	
gta cgt gta gtg ggc cgg aat gga gaa tcc agt gaa ctg gac cta caa	507

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Val Arg Val Val Gly Arg Asn Gly Glu Ser Ser Glu Leu Asp Leu Gln
 110 115 120
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 Gly Ile Arg Ile Asp Ser Asp Ile Ser Gly Thr Leu Lys Phe Ala Cys
 125 130 135
 gag agc att gtg gag gaa tac gag gat gaa ctc att gaa ttc ttt tcc 603
 Glu Ser Ile Val Glu Glu Tyr Glu Asp Glu Leu Ile Glu Phe Phe Ser
 140 145 150
 cga gag gct gac aat gtt aaa gac aaa ctt tgc agt aag cga aca gat 651
 Arg Glu Ala Asp Asn Val Lys Asp Lys Leu Cys Ser Lys Arg Thr Asp
 155 160 165
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 Leu Cys Asp His Ala Leu His Ile Ser His Asp Glu Leu
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 Met Arg Arg Leu Leu Ile Pro Leu Ala Leu Trp Leu Gly
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 Ala Val Gly Val Gly Val Ala Glu Leu Thr Glu Ala Gln Arg Arg Gly
 15 20 25

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Leu Gln Val Ala Leu Glu Glu Phe His Lys His Pro Pro Val Gln Trp	
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gcc ttc cag gag acc agt gtg gag agc gcc gtg gac acg ccc ttc cca	255
Ala Phe Gln Glu Thr Ser Val Glu Ser Ala Val Asp Thr Pro Phe Pro	
50 55 60	
gct gga ata ttt gtg agg ctg gaa ttt aag ctg cag cag aca agc tgc	303
Ala Gly Ile Phe Val Arg Leu Glu Phe Lys Leu Gln Gln Thr Ser Cys	
65 70 75	
cgg aag agg gac tgg aag aaa ccc gag tgc aaa gtc agg ccc aat ggg	351
Arg Lys Arg Asp Trp Lys Lys Pro Glu Cys Lys Val Arg Pro Asn Gly	
80 85 90	
agg aaa cgg aaa tgc ctg gcc tgc atc aaa ctg ggc tct gag gac aaa	399
Arg Lys Arg Lys Cys Leu Ala Cys Ile Lys Leu Gly Ser Glu Asp Lys	
95 100 105	
gtt ctg ggc cgg ttg gtc cac tgc ccc ata gag acc caa gtt ctg cgg	447
Val Leu Gly Arg Leu Val His Cys Pro Ile Glu Thr Gln Val Leu Arg	
110 115 120 125	
gag gct gag gag cac cag gag acc cag tgc ctc agg gtg cag cgg gct	495
Glu Ala Glu Glu His Gln Glu Thr Gln Cys Leu Arg Val Gln Arg Ala	
130 135 140	
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Gly Glu Asp Pro His Ser Phe Tyr Phe Pro Gly Gln Phe Ala Phe Ser	
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aag gcc ctg ccc cgc agc taa gccagcactg agctgcgtgg tgcctccagg	594
Lys Ala Leu Pro Arg Ser	
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 Met Arg Leu Thr
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cgg aag cgg ctc tgc tgg ttt ctt atc gcc ctg tac tgc cta ttc tcc 164
 Arg Lys Arg Leu Cys Ser Phe Leu Ile Ala Leu Tyr Cys Leu Phe Ser
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ctc tac gct gcc tac cac gtc ttc ttc ggg cgc cgc cgc cag ggc cgg 212
 Leu Tyr Ala Ala Tyr His Val Phe Phe Gly Arg Arg Arg Gln Ala Pro
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gcc ggg tcc ccg cgg ggc ctc agg aag ggg ggc gcc ccc ggc cgg gag 260
 Ala Gly Ser Pro Arg Gly Leu Arg Lys Gly Ala Ala Pro Ala Arg Glu
 40 45 50

aga cgc ggc cga gaa cag tcc act ttg gaa agt gaa gaa tgg aat cct 308
 Arg Arg Gly Arg Glu Gln Ser Thr Leu Glu Ser Glu Glu Trp Asn Pro
 55 60 65

tgg gaa gga gat gaa aaa aat gag caa caa cac aga ttt aaa act agc 356
 Trp Glu Gly Asp Glu Lys Asn Glu Gln Gln His Arg Phe Lys Thr Ser
 70 75 80

ctt caa ata tta gat aaa tcc acg aaa gga aaa aca gat ctc agt gta 404
 Leu Gln Ile Leu Asp Lys Ser Thr Lys Gly Lys Thr Asp Leu Ser Val
 85 90 95 100

caa atc tgg ggc aaa gct gcc att ggc ttg tat ctc tgg gag cat att 452
 Gln Ile Trp Gly Lys Ala Ala Ile Gly Leu Tyr Leu Trp Glu His Ile
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ttt gaa ggc tta ctt gat ccc agc gat gtg act gct caa tgg aga gaa 500
 Phe Glu Gly Leu Leu Asp Pro Ser Asp Val Thr Ala Gln Trp Arg Glu
 120 125 130

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gga aag tca atc gta gga aga aca cag tac agc ttc atc act ggt cca	548
Gly Lys Ser Ile Val Gly Arg Thr Gln Tyr Ser Phe Ile Thr Gly Pro	
135 140 145	
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Ala Val Ile Pro Gly Tyr Phe Ser Val Asp Val Asn Asn Val Val Leu	
150 155 160	
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Ile Leu Asn Gly Arg Glu Lys Ala Lys Ile Phe Tyr Ala Thr Gln Trp	
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Leu Leu Tyr Ala Gln Asn Leu Val Gln Ile Gln Lys Leu Gln His Leu	
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Ala Val Val Leu Leu Gly Asn Glu His Cys Asp Asn Glu Trp Ile Asn	
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Tyr Asp Ser Pro Trp Ile Asn Asp Val Asp Val Phe Gln Trp Pro Leu	
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Met Leu His Asp Glu Arg Pro Tyr Leu Cys Asn Phe Leu Gly Thr Ile	
265 270 275	
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Tyr Glu Asn Ser Ser Arg Gln Ala Leu Met Asn Ile Leu Lys Lys Asp	
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Gly Asn Asp Lys Leu Cys Trp Val Ser Ala Arg Glu His Trp Gln Pro	
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Ile Tyr Glu Ala Cys Ser Tyr Gly Ser Ile Pro Val Val Glu Asp Val	
345 350 355	
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Met Thr Ala Gly Asn Cys Gly Asn Thr Ser Val His His Gly Ala Pro	
360 365 370	
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Leu Gln Leu Leu Lys Ser Met Gly Ala Pro Phe Ile Phe Ile Lys Asn	
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Trp Lys Glu Leu Pro Ala Val Leu Glu Lys Glu Lys Thr Ile Ile Leu	
390 395 400	
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Gln Glu Lys Ile Glu Arg Arg Lys Met Leu Leu Gln Trp Tyr Gln His	
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Phe Lys Thr Glu Leu Lys Met Lys Phe Thr Asn Ile Leu Glu Ser Ser	
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